	Application No.	Applicant(s)
Notice of Allowability	10/724,213	OGAWA, YASUSHI
	Examiner	Art Unit
	Joon H. Hwang	2166

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *a telephone interview with Colin Harris (Reg. No. 58,969) on 9/27/06.*

2. ☒ The allowed claim(s) is/are *1-36 and 39 (renumbered as 1-37)*.

3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☒ All   b) ☐ Some*   c) ☐ None   of the:

        1. ☐ Certified copies of the priority documents have been received.

        2. ☒ Certified copies of the priority documents have been received in Application No. *09/639,108* .

        3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

    * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application. **THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.

    (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached

        1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.

    (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)

2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)

3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____

4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material

5. ☐ Notice of Informal Patent Application

6. ☒ Interview Summary (PTO-413), Paper No./Mail Date *20060927* .

7. ☒ Examiner's Amendment/Comment

8. ☒ Examiner's Statement of Reasons for Allowance

9. ☐ Other _____.

DETAILED ACTION

1.   The applicant canceled claims 37-38 in the amendment received on 9/13/06.

The claims 1-36 and 39 are pending.

Terminal Disclaimer

2.   The terminal disclaimer filed on 9/13/06 disclaiming the terminal portion of any

patent granted on this application which would extend beyond the expiration date of

U.S. Patent No. 6,714,927 has been reviewed and is accepted. The terminal disclaimer

has been recorded.

EXAMINER'S AMENDMENT

3.   An examiner's amendment to the record appears below. Should the changes

and/or additions be unacceptable to applicant, an amendment may be filed as provided

by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be

submitted no later than the payment of the issue fee.

4.   Authorization for this examiner's amendment was given in a telephone interview

with Colin Harris (Reg. No. 58,969) on 9/27/06.

5.   The application has been amended as follows:

Rewrite claim 1 as follows:

"1. An apparatus for retrieving documents, comprising:

a processor;

a document dividing part configured to divide each document into character strings as index keys;

an index table configured to maintain the index keys and document information relating to each index key;

a query character string dividing part configured to divide a query character string into a plurality of index keys;

a retrieval condition analyzing part configured to analyze a retrieval condition including the index keys divided from the query character string and to generate a retrieval condition tree where the index keys divided from the query character string are synthesized by at least one operator that retrieves an intermediate retrieval result including the document information from said index table; and

a retrieval condition evaluating part configured to evaluate each intermediate retrieval result obtained by the retrieval condition tree, to determine a final retrieval result, and to retrieve documents of the final retrieval result,

wherein:

said document dividing part divides the document into index keys of n-character strings having n characters and m-character strings having m characters where n is an integer greater than one and m is an integer less than n, and each of the m-character strings includes a last character of the document,

when at least two index keys are divided from the query character string by said query character string dividing part, said retrieval condition analyzing part

includes:

a first condition tree generating part generating a first condition tree

synthesized by at least one AND set operator obtaining an AND set of a plurality

of intermediate retrieval results based on said at least two index keys, and

a second condition tree generating part selecting a minimum number of

index keys, which cover a full length of the query character string, from said at

least two index keys and generating a second condition tree synthesized by at

least one distance operator indicating a distance between appearance positions

of said at least two index keys,

said retrieval condition analyzing part includes a document determining

part obtaining candidate documents by executing the first condition tree and

determining documents from the candidate documents by calculating the second

condition tree, and

said first condition tree generating part generates the first condition tree by

index keys used in the second condition tree and other index keys positioned in

the query character string before or after the index keys used in the second

condition tree and indicating a least number of the documents including the other

index keys.";

Rewrite claim 2 as follows:

"2. The apparatus as claimed in claim 1, wherein:

said query character string dividing part divides a query character string

into more than two index keys of n-character strings having n characters to

overlap a query character when a length of the query character string is more

than n+1 characters where n is an integer greater than one; and

said retrieval condition analyzing part synthesizes the more than two index

keys by at least one distance operator indicating a distance between the more

than two index keys divided by said query character string dividing part.";

Rewrite claim 3 as follows:

"3. The apparatus as claimed in claim 1, wherein:

said query character string dividing part defines a query character string

as a single index key when the query character string is n characters in length

where n is an integer greater than one; and

said retrieval condition analyzing part generates a final retrieval condition

formed by the single index key.";

Rewrite claim 4 as follows:

"4. The apparatus as claimed in claim 1, wherein:

said query character string dividing part outputs index keys from said

index table where a first part of each index key identically corresponds to a first

part of the query character string when a length of the query character string is less than n characters where n is an integer greater than one; and

said retrieval condition analyzing part generates the retrieval condition tree where the index keys, which are output by said query character string dividing part, are synthesized by at least one OR set operator obtaining an OR set of a plurality of intermediate retrieval results.";

Rewrite claim 7 as follows:

"7. The apparatus as claimed in claim 1, wherein said query character string dividing part outputs index keys from said index table where a beginning part of each index key identically corresponds to a beginning part of the query character string when a length of the query character string is less than n characters where n is an integer greater than one.";

Rewrite claim 14 as follows:

"14. The apparatus as claimed in claim 1, wherein when at least two index keys are divided from the query character string by said query character string dividing part, said retrieval condition analyzing part includes:

a first condition tree generating part generating a first condition tree synthesized by at least one AND set operator obtaining an AND set of a plurality

of the intermediate retrieval results based on said at least two index keys; and

a second condition tree generating part selecting index keys, which cover a full length of the query character string and indicate a least total number of the documents including the selected index keys, from said at least two index keys and generating a second condition tree synthesized by at least one distance operator indicating a distance between appearance positions of said at least two index keys,

wherein:

said retrieval condition analyzing part includes a document determining part obtaining candidate documents by executing the first condition tree and determining documents from the candidate documents by calculating the second condition tree, and

said first condition tree generating part generates the first condition tree by index keys used in the second condition tree and other index keys positioned in the query character string before or after the index keys used in the second condition tree and indicating a least number of the documents including the other index keys.";

Rewrite claim 19 as follows:

"19. The apparatus as claimed in claim 1, wherein said retrieval condition evaluating part checks, in a set difference operator obtaining a set difference between

two retrieval results, a first retrieved document obtained by a first node is potentially a

candidate document for a second node and determines the first retrieved document not

to be the candidate document in accordance with a result of checking.";

Rewrite claim 20 as follows:

"20. The apparatus as claimed in claim 1, wherein said retrieval condition

evaluating part obtains, in order to evaluate an AND set operator, candidate documents

for each child node, checks whether or not the candidate documents are included in a

result set obtained by the AND set operator, determines whether or not the candidate

documents are documents corresponding to the child node based on a check result,

and adds the documents corresponding to the child node to the AND set operator based

on a determination result.";

Rewrite claim 21 as follows:

"21. A method for retrieving documents comprising the steps of:

    (a) dividing each document into character strings as index keys;

    (b) maintaining the index keys and document information relating to each

index key in an index table;

    (c) dividing a query character string into a plurality of index keys;

    (d) analyzing a retrieval condition including the index keys divided from the

query character string and generating a retrieval condition tree where the index

keys divided from the query character string are synthesized by at least one

operator that retrieves an intermediate retrieval result including the document

information from said index table; and

(e) evaluating each intermediate retrieval result obtained by the retrieval

condition tree, determining a final retrieval result, and retrieving documents of the

final retrieval result, wherein:

said step (a) divides the document into index keys of n-character strings

having n characters and m-character strings having m characters where n is an

integer greater than one and m is an integer less than n, and each of the m-

character strings includes a last character of the document,

when at least two index keys are divided from the query character string in

said step (c), said step (d) includes the steps of:

(f) generating a first condition tree synthesized by at least one AND set

operator obtaining an AND set of a plurality of intermediate retrieval results

based on said at least two index keys, and

(g) selecting a minimum number of index keys, which cover a full length of

the query character string, from said at least two index keys and generating a

second condition tree synthesized by at least one distance operator indicating a

distance between appearance positions of said at least two index keys,

said step (d) includes a step of obtaining candidate documents by

executing the first condition tree and determining documents from the candidate

documents by calculating the second condition tree, and

said step (f) generates the first condition tree by index keys used in the

second condition tree and other index keys positioned in the query character

string before or after the index keys used in the second condition tree and

indicating a least number of the documents including the other index keys.";

Rewrite claim 22 as follows:

"22. The method as claimed in claim 21, wherein:

said step (c) divides a query character string into more than two index

keys of n-character strings having n characters to overlap query character when

a length of the query character string is more than n+1 characters where n is an

integer greater than one, and

said step (d) synthesizes the more than two index keys by at least one

distance operator indicating a distance between the more than two index keys

divided in said step (c).";

Rewrite claim 23 as follows:

"23. The method as claimed in claim 21, wherein:

said step (c) defines a query character string as a single index key when

the query character string is n characters in length where n is an integer greater

than one; and

said step (d) generates a final retrieval condition formed by the single

index key.";

Rewrite claim 24 as follows:

"24. The method as claimed in claim 21, wherein:

said step (c) outputs index keys from said index table where a first part of

each index key identically corresponds to a first part of the query character string

when a length of the query character string is less than n characters where n is

an integer greater than one; and

said step (d) generates the retrieval condition tree where the index keys,

which are output in said step (c), are synthesized by at least one OR set operator

obtaining an OR set of a plurality of intermediate retrieval results.";

Rewrite claim 27 as follows:

"27. The method as claimed in claim 21, wherein said step (e) checks, in a set

difference operator obtaining a set difference between two retrieval results, a first

retrieved document obtained by a first node is potentially a candidate document for a

second node and determines the first retrieved document not to be the candidate

document in accordance with a result of checking.";

Rewrite claim 28 as follows:

"28. The method as claimed in claim 21, wherein said step (e) obtains, in order to evaluate an AND set operator, candidate documents for each child node, checks whether or not the candidate documents are included in a result set obtained by the AND set operator, determines whether or not the candidate documents are documents corresponding to the child node based on a check result, and adds the documents corresponding to the child node to the AND set operator based on a determination result.";

Rewrite claim 29 as follows:

"29. A computer-readable recording medium having a program code recorded therein for causing a computer to retrieve documents, said program code comprising codes for:

(a) dividing each document into character strings as index keys;

(b) maintaining the index keys and document information relating to each index key in an index table;

(c) dividing a query character string into a plurality of index keys;

(d) analyzing a retrieval condition including the index keys divided from the query character string and generating a retrieval condition tree where the index

keys divided from the query character string are synthesized by at least one

operator that retrieves an intermediate retrieval result including the document

information from said index table; and

(e) evaluating each intermediate retrieval result obtained by the retrieval

condition tree, determining a final retrieval result, and retrieving documents of the

final retrieval result, wherein:

said code (a) divides the document into index keys of n-character strings

having n characters and m-character strings having m characters where n is an

integer greater than one and m is an integer less than n, and each of m-character

strings includes a last character of the document,

when at least two index keys are divided from the query character string

by said code (c), said code (d) includes codes of:

(f) generating a first condition tree synthesized by at least one AND set

operator obtaining an AND set of a plurality of intermediate retrieval results

based on said at least two index keys,

(g) selecting a minimum number of index keys, which cover a full length of

the query character string, from said at least two index keys and generating a

second condition tree synthesized by at least one distance operator indicating a

distance between appearance positions of said at least two index keys,

said code (d) includes a code of obtaining candidate documents by

executing the first condition tree and determining documents from the candidate

documents by calculating the second condition tree, and

said code (f) generates the first condition tree by index keys used in the

second condition tree and other index keys positioned in the query character

string before or after the index keys in the second condition tree and indicating a

least number of the documents including the other index keys.";

Rewrite claim 30 as follows:

"30. The computer-readable recording medium as claimed in claim 29, wherein

said code (c) divides a query character string into more than two index keys of n-

character strings having n characters to overlap a query character when a length of the

query character string is more than n+1 characters where n is an integer greater than

one, and

said code (d) synthesizes the more than two index keys by at least one distance

operator indicating a distance between the more than two index keys divided by said

code (c).";

Rewrite claim 31 as follows:

"31. The computer-readable recording medium as claimed in claim 29, wherein

said code (c) defines a query character string as a single index key when the query

character string is n characters in length where n is an integer greater than one, and

said code (d) generates a final retrieval condition formed by the single index

key.";

Rewrite claim 32 as follows:

"32. The computer-readable recording medium as claimed in claim 29, wherein said code (c) outputs index keys from said index table where a first part of each index key identically corresponds to a first part of the query character string when a length of the query character string is less than n characters where n is an integer greater than one, and

said code (d) generates the retrieval condition tree where the index keys, which are output by said code (c), are synthesized by at least one OR set operator obtaining an OR set of a plurality of intermediate retrieval results.";

Rewrite claim 35 as follows:

"35. The computer-readable recording medium as claimed in claim 29, wherein said code (e) checks, in a set difference operator obtaining a set difference between two retrieval results, a first retrieved document obtained by a first node is potentially a candidate document for a second node and determines the first retrieved document not to be the candidate document in accordance with a result of checking.";

Rewrite claim 36 as follows:

"36. The computer-readable recording medium as claimed in claim 29, wherein said code (e) obtains, in order to evaluate an AND set operator, candidate documents for each child node, checks whether or not the candidate documents are included in a result set obtained by the AND set operator, determines whether or not the candidate documents are documents corresponding to the child node based on a check result, and adds the documents corresponding to the child node to the AND set operator based on a determination result."; and

Rewrite claim 39 as follows:

"39. The apparatus as claimed in claim 14, wherein said retrieval condition evaluating part checks, in a set difference operator obtaining a set difference between two retrieval results, a first retrieved document obtained by a first node is possible to be a candidate document for a second node and determines the first retrieved document not to be the candidate document in accordance with a result of checking.".

Allowable Subject Matter

6.   Claims 1-36 and 39 are allowed.   .

Claims 1, 21, and 29 identify the distinct features, the retrieval condition analyzing including generating a first condition tree synthesized by at least one AND set operator obtaining an AND set of a plurality of intermediate retrieval results based on

said at least two index keys, and selecting a minimum number of index keys, which

cover a full length of the query character string, from said at least two index keys and

generating a second condition tree synthesized by at least one distance operator

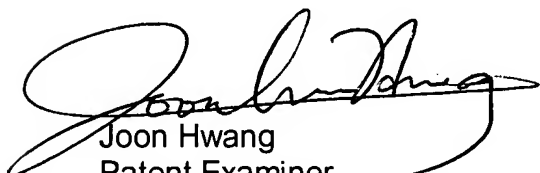indicating a distance between appearance positions of said at least two index keys.

The closest prior art, Rangarajan et al. (U.S. Patent No. 5,706,365) disclosing retrieval

of document using a n-gram index of documents and a n-gram of a query, fails to

suggest the claimed limitation as mentioned above in combination with other claimed

elements. The above features in conjunction with all other limitations of the dependent

and independent claims 1-36 and 39 are hereby allowed.

7.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Joon H. Hwang whose telephone number is 571-272-

4036. The examiner can normally be reached on 9:30-6:00(M~F).

        If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Hosain T. Alam can be reached on 571-272-3978. The fax phone number

for the organization where this application or proceeding is assigned is 571-273-8300.

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published applications may be obtained from either Private PAIR or Public PAIR.

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USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Patent Examiner
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9/27/06